CLAIMS

1. A process for producing $CaCO_3$, charaterized in that it comprises the steps of:

a) catalysing the hydration of CO_2 contained in a CO_2-containing gas by means of an enzyme capable of catalysing the hydration of dissolved CO_2 into hydrogen ions and bicarbonate ions, thereby producing a solution containing bicarbonate ions and hydrogen ions;

b) reacting the bicarbonate ions contained in the solution obtained in step a) with calcium ions, thereby producing a solution containing $CaCO_3$; and

c) precipitating the $CaCO_3$ contained in the solution obtained in step b).

2. A process according to claim 1, characterized in that step b) comprises the step of:

-mixing the solution obtained in step a) with $Ca(OH)_2$, thereby providing said calcium ions.

3. A process according to claim 1 or 2, characterized in that said enzyme is carbonic anhydrase or an analogue thereof.

4. A process according to any one of claims 1 to 3, characterized in that step a) of hydration of CO_2 is performed in a bioreactor comprising a reaction chamber filled with said enzyme and the step b) is performed in at least one separate reaction tank, the process further comprising a step of directing a flow of said solution from said bioreactor into said reaction tank.

5. A process according to claim 4, characterized in that the reaction chamber is filled with packing on which the enzyme is immobilized.

6. A process according to any one of claims 1 to 5, characterized in that step b) is performed under stirring to prevent the calcium carbonate from settling.

7. A process according to any one of claims 1 to 6, characterized in that it comprises an additional step of:

d) separating the precipitate of $CaCO_3$ of step c) from the solution.

8. A process according to claim 6, characterized in that step d) of separating consists of filtering.

9. An apparatus for producing $CaCO_3$ according to the process defined in claim 1, characterized in that it comprises:

- catalyzing means for catalysing the hydration of the CO_2 into bicarbonate ions and hydrogen ions;

-reacting means for reacting the bicarbonate ions obtained in the catalyzing means with calcium ions to produce $CaCO_3$; and

-precipitating means for precipitating the $CaCO_3$ obtained in the reacting means.

10. An apparatus according to claim 9, characterized in that the means for catalyzing the hydration of the CO_2 comprises a bioreactor comprising:

-a gas inlet for receiving gaseous CO_2;

-a liquid inlet for receiving an aqueous liquid;

-a reaction chamber in fluid communication with the gas inlet and the liquid inlet, the reaction chamber containing therein enzymes capable of catalysing the hydration of dissolved CO_2 into bicarbonate ions and hydrogen ions; and

- a liquid outlet in fluid communication with the reaction chamber for discharging a solution of bicarbonate ions and hydrogen ions.

11. An apparatus as claimed in claim 10, characterized in that the enzyme is carbonic anhydrase.

12. An apparatus as claimed in claim 10 or 11, characterized in that the means for reacting the bicarbonate ions with calcium ions and precipitating $CaCO_3$ is at least one reaction tank having an inlet in fluid communication with the liquid outlet of the bioreactor and an outlet to discharge a solution containing $CaCO_3$.

13. An apparatus as claimed in claim 12, characterized in that it comprises a buffer tank having an inlet in fluid communication with the outlet of the at least one reaction tank for receiving and reserving the solution obtained in said at least one reaction tank for a further treatment.

14. An apparatus according to claim 13, characterized in that it comprises a filter in fluid communication with said buffer tank to separate the $CaCO_3$ from the solution.